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**WAITING TIME PERCEPTION OF PUBLIC TRANSPORT USER: EFFECTS
OF SOCIO-DEMOGRAPHIC AND TRIP CHARACTERISTICS IN MALAYSIA**

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THESIS SUBMITTED TO:

SCHOOL OF TECHNOLOGY MANAGEMENT AND LOGISTICS

UNIVERSITI UTARA MALAYSIA

IN FULFILMENT OF THE REQUIREMENT FOR THE MASTER OF SCIENCE

IN TRANSPORTATION AND LOGISTICS MANAGEMENT

MARCH 2023



Kolej Perniagaan
(College of Business)
Universiti Utara Malaysia

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(Title of the Thesis / Dissertation)

: Waiting Time Perception of Public Transport User: Effect of Socioeconomic and Trip Characteristics in Malaysia

Program Pengajian
(Programme of Study)

: Master of Science (Transportation and Logistics Management)

Nama Penyelia/Penyelia-penyelia
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ABSTRACT

Waiting time perceived is how long people think they have had to wait for a service. People waiting for public transportation are more likely to think they have to wait longer than they actually do, especially when they don't have access to traffic data in real time. Nevertheless, there are an amount of concerns involving with public transportation services and limited numbers of studies in Malaysia have investigated waiting time perception. Hence, the aim of this study discussed about the effects of Socio-demographic characteristics and trip characteristics on the waiting time perception of public transport in Malaysia. This involved determining two relationships, which are the relationship between waiting time perception and Socio-demographic characteristics; and the relationship between waiting time perception and trip characteristics. The research study was conducted in Northern States of Malaysia (Penang, Kedah, Perlis, Perak) with an estimated 196 respondents making up the sample size. Descriptive analysis and Multiple Regression Analysis (MRA) were used to test the hypotheses and figure out which factors were the most important for the research model. Based on the analysis results, it revealed that trip characteristics is significantly associated to waiting time perception. It shows that greater level of trip characteristics contributes to greater level of waiting time perception. The results of the research showed that there is no significant relationship between Socio-demographic characteristics and waiting time perception.

KEYWORDS: public transport, waiting time perception, Socio-demographic characteristics, trip characteristics.

ABSTRAK

Masa menunggu yang dilihat ialah berapa lama orang berfikir bahawa mereka terpaksa menunggu untuk perkhidmatan. Orang yang menunggu pengangkutan awam lebih cenderung berfikir bahawa mereka perlu menunggu lebih lama daripada yang sebenarnya, terutamanya apabila mereka tidak mempunyai akses kepada data trafik dalam masa nyata. Namun begitu, terdapat sejumlah kebimbangan yang melibatkan perkhidmatan pengangkutan awam dan bilangan kajian yang terhad di Malaysia telah menyiasat persepsi masa menunggu. Justeru itu, matlamat kajian ini membincangkan tentang kesan ciri sosioekonomi dan ciri perjalanan terhadap persepsi masa menunggu pengangkutan awam di Malaysia. Ini melibatkan penentuan dua hubungan, iaitu hubungan antara persepsi masa menunggu dan ciri sosioekonomi; dan hubungan antara persepsi masa menunggu dan ciri perjalanan. Kajian penyelidikan telah dijalankan di Negeri Utara Malaysia (Pulau Pinang, Kedah, Perlis, Perak) dengan anggaran saiz sampel seramai 196 orang responden. Analisis deskriptif dan Analisis Regresi Berganda (MRA) telah dijalankan untuk menguji hipotesis yang dicadangkan dan menentukan faktor yang paling berpengaruh untuk dimasukkan ke dalam model penyelidikan. Berdasarkan keputusan analisis, ia mendedahkan bahawa ciri perjalanan secara signifikan dikaitkan dengan persepsi masa menunggu. Ia menunjukkan tahap ciri perjalanan yang lebih tinggi menyumbang kepada tahap persepsi masa menunggu yang lebih tinggi. Hasil kajian menunjukkan tidak terdapat hubungan yang signifikan antara ciri sosioekonomi dengan persepsi masa menunggu.

KATA KUNCI: pengangkutan awam, persepsi masa menunggu, ciri sosioekonomi, ciri perjalanan.

ACKNOWLEDGEMENT

To begin, I would like to express my gratitude to my supervisor, Dr. Md. Abdul Kafi, for his continuing support throughout my master's study and related research, as well as for his patience, encouragement, and vast knowledge. His guidance assisted me greatly in conducting research and completing this thesis. Furthermore, I would like to express my sincerest gratitude to all the other lecturers in UUM who contributed to support with my research. They are always willing to help me whenever I get into a problem or have a difficulty regarding my research or writings.



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CHAPTER ONE:

INTRODUCTION

1.0 BACKGROUND OF THE STUDY

Public transport is a way for people to get around by group travel systems that anyone can use, unlike private transport. Public transportation is among the most crucial parts of a city center's growth and sustainability (Almselati et al., 2015). It helps describe a city's social traits and economic growth (Zuidgeest, 2005).

In cities and towns all over the country, public transportation gives people the freedom to move around and access to a job, community resources, medical care, and fun things to do. Pawlasova (2015) established that public transportation is very vital, especially in big cities and tourist hubs. Public transportation has many benefits, such as environmental sustainability and drastically reducing on fossil fuel use (Stjernborg & Mattisson, 2016). Public transport is cheaper than using your own car to get around. People who live in cities but don't have a lot of money may find that public transportation is the best way to save money (Ustadia & Shopia, 2016). Wubet (2018) also revealed that putting money into rail transit and other public transportation makes it easier for people to get to work, shops, and recreational activities.

Hall (2001) revealed that age, whether or not a person needs to be somewhere by a certain time, and whether or not a person is taking a route for the first time all affect how long people have to wait and how much information they get. When the time between buses is long enough, many people choose to look at a schedule and time their arrival at the stop with the bus. Similarly, Millonig et al., (2012) indicated that Waiting for public

transportation is one of the most important things that makes people unhappy with public transportation. Even though there are many ways to improve the waiting experience for passengers, not much is known about how different offers work in different situations, such as when the site is different or when different groups want different things.

Many different things can affect how people feel about the length of time they have to wait, such as boredom, irritation, anxiety, or stress (Hagen et al., 2009), which in turn affects how customers feel about the quality of the service (Pruyn & Smidts, 1998). The effect gets worse as the (subjective) waiting time goes up: the longer a person thinks he has to wait, the less happy he is with the service (Durrande-Moreau & Usunier, 1999; Hul et al., 1997). So, waiting time is the least important part of a public transportation trip (Hagen et al., 2009).

Waiting time perceived is how long people think they have had to wait for a service (Baker & Cameron, 1996). But how customers feel about waiting is more affected by how long they think they have to wait than by how long they actually have to wait (Barron et al., 2013; Hornik, 1993; Maister, 1985; Pruyn & Smidts, 1998).

How long a passenger can stand to wait may depend on their age, gender, and the reason for their trip, among other things. Previous studies also did not take into account the different types of customers (Butcher & Kayani, 2008; McDonell, 2007; Munichor & Rafaeli, 2007; Van Hagen, van Pruyn, Galetzka, & Kramer, 2009). Trip characteristics is wherever a person walks from house to a bus stop, then takes a bus to a station for mass transit before walking to work (Meng et al., 2018).

Ibtishamiah et al. (2013) said that public transport passengers' perceptions and demand satisfaction in Petaling Jaya District, Malaysia, showed that bus riders are generally unhappy with how effective and efficient stage bus services are in Petaling Jaya Municipal Council. Most of the people who use public transportation and those who do not (59.1%) complain about how long they have to wait, as many of them use this type of public transport for working trip.

Kuo & Tang (2011) established that customer satisfaction is affected by the customer's expectations, the quality of the service, the perceived value of the service, and user's waiting time perception but it also affects the customer's plans to act. The idea of customer satisfaction has been used successfully to measure the satisfaction of bus passengers, mostly from the point of view of general passengers (Shen et al., 2016; Wu et al., 2016), but not from the point of view of elderly passengers.

Still, the quality of public transportation is not what people expect, and the quality of public transportation is a major factor in how people choose to get around. Local governments and transit service providers need to know how people feel about how good the public transport services are in order to plan ways to improve the way the system works. Several studies have shown that improving how people feel about the quality of public transportation services and how satisfied they are with them helps not only to keep current users but also to bring in new ones (Bamberg et al., 2003; Beirão & Sarsfield Cabral, 2007).

Since transit strategy is made more with the requirements of the operators in mind, and without knowing how users feel about the service and what they think of it, it is hard to measure the quality and benefits of public transport (Wu et al., 2016; Cheng and Liu, 2012).

Eboli & Mazzulla (2009) found that, of all the service attributes, the security of the bus,

the reliability of the schedule, and the appearance of the staff have the biggest effect on how satisfied passengers are as a whole. Dell'Olio et al. (2011) looked at what potential transit riders want in terms of the level of service and the waiting time, the level of occupancy, and the time on board were deemed to be more important factors. De Oña et al. (2013) used the SEM to look at the relationship between service quality and total level of satisfaction. They found that personnel, comfort, and service were the most important things that affected the quality of service of public transport.

In the past decade, numerous articles (Hall, 2001; Millonig et al., 2012) have investigated at how perceptions of waiting time in public transport affect how people feel about public transportation. But so far, not much has been done to find out what makes people feel like time is passing when they are waiting for public transportation. There are many types of public transportation in Malaysia, like trains, buses, taxis, and trishaws, but none of them can provide the quality of service that people need (Khalid et al., 2014).

This study waiting time perception will contribute and help the public transport users to face the outcomes of waiting time perception in Malaysia. Usually, the users of public transport face some challenges and problems when they are waiting public transport services.

1.1 PROBLEM STATEMENT

Waiting time perception is how people think and feel about how long they have to wait and how that affects how they act when they get there (Baker & Cameron, 1996). How long people think they have to wait for public transportation trips has a direct effect on how happy they are. Crowding, for instance, has a detrimental and non-linear effect on how

travelers rate their travel satisfaction (Soza-Parra et al., 2019), and a lack of comfort, too many people, and bad weather can make people think they have to wait longer (Beirão & Sarsfield Cabral, 2007).

Some empirical evidence (Gong et al., 2016; Sun et al., 2015) showed that urban trip makers arrive at transit stops at the same time, so their waiting time is usually in sync with when public transportation runs. Because of the above, more and more transit agencies have proposed finding the right policy requirements to make waiting at transit stops seem less of a burden (Fan et al., 2016). For trips on public transportation, the travel exact parameters usually include a detailed breakdown of the trip, such as how to get to the transit stop, the waiting time, how long you are in the vehicle, and how you get out of the journey's end stop (Koppelman & Bhat, 2006).

People waiting for public transportation are more likely to think they have to wait longer than they actually do, especially when they don't have access to traffic data in real time (Cheng & Tsai, 2014). The elements influencing the perception of waiting time differ from city to city, but age and busy times are the most common ones. Several studies also found that the time people thought they spent walking was often longer than the time they actually spent walking. Some of the things that may have led to this overestimation are the physical facets of transfer facilities, like signs, lights, circulation lines, and the environment around them (Hall, 2001). Furthermore, walking time during transfers has been shown to be harder than walking time during the first and last miles.

There are a lot of studies and researches been conducted among public transport. The researches and studies were focused more into the perception of public transport to the

travel time and also they just refer one particular trip stage. Recently, there are limited empirical studies done among waiting time perception especially in the Malaysian context.

It has been shown that waiting times, especially when they are uncertain, are seen as much more difficult than other parts of a trip on public transportation (Wardman et al. 2016). But pre-trip or enroute information can reduce both waiting time perception and actual waiting time (Brakewood and Watkins 2018).

Passengers tend to think that time spent in-vehicle is better than time spent waiting outside (Chapman et al., 2006). Since most of the time spent in-vehicle is based on how long the trip is supposed to take and how fast the car goes, researchers usually figure out how much time spent in-vehicle is worth by using generalized cost equations and evaluating stop postponement. A limited studies have been done to see if there is a variance among perceived time spend in vehicle and actual time spend there.

People frequently use more than one type of transportation to get where they need to go these days. This would also have a big effect on how they got to work (Shannon et al., 2006) and how long it took them to travel. Conversely, travel times that don't match the plan will make the user think less of the service (Gooze et al., 2013). For Mass Rapid Transport (MRT), the travel time is made up of several parts, things like transit time (Ren and Huang, 2020; Tang and Thakuriah, 2011; Gooze et al., 2013), access time, latency, and transit time (Fan et al., 2016). In addition, the perception of waiting time may vary depending on the transfer situation and attributes, such as transfer time and required time, transfer schedule, and number of transfers (Ren and Huang, 2020).

According to Muhamad Nazri Borhan et al., (2019) exposed that many users of public transport. they insisted on waiting quite a while for the bus. Moreover, Zaherawati et al., (2010) stated that one problem with public transportation in Malaysia is that the Light Rail Transit and Keretapi Tanah Melayu Berhad are always late. Users were less happy with the excellence of this public transportation, especially in terms of how long they had to wait and how often trains came.

Presently, to our finest knowledge, current studies on the perception of waiting time concentrate on a single travel stage and limited studies has examined the waiting time perception on the basis of a complete trip. In general, these estimates only considered the examination of a single stage (such as the transfer stage) and did not take into account potential causality from other stages. Additionally, several studies employed unreliable data from surveys that were completed a short while (a few hours or a day) following the journey, which is unreliable. Thus, for this reason this study adds to the prevailing body of knowledge by examining the effect of Socio-demographic characteristics and trip characteristics on public transport waiting time perception also considering the connection of different stages in the whole trip in northern states of Malaysia.

1.2 RESEARCH OBJECTIVES

The researcher proposed the following objectives:

- I. To determine the level of waiting time perception;
- II. To examine the effect of Socio-demographic characteristics on waiting time perception;

- III. To examine the relationship between trip characteristics and waiting time perception.

1.3 RESEARCH QUESTIONS

This research focuses on the following questions:

- I. Does the level of perception effect the waiting time?
- II. Is there effect of Socio-demographic characteristics on waiting time perception?
- III. Is there relationship between trip characteristics and waiting time perception?

1.4 SCOPE OF THE STUDY

This research will carry out in northern states (Kedah, Penang, Perak and Perlis) of Malaysia. northern states are chosen because it is one of the states where there is no research has focused on the effect of Socio-demographic characteristics and trip characteristics on public transport waiting time perception has been carried out.

1.5 SIGNIFICANCE OF THE RESEARCH

This research has significant contribution to the body of knowledge. Many previous studies have been done among public transport waiting time perception and there is limited researches done in the Malaysian context. Khalid et al., (2014) looked at how people in Kuala Lumpur, Malaysia, felt about the rail public transportation services they used. They found that the first problem KTM users face is long wait times. Also, most of the research done in the past has focused on just one trip stage.

The significance of this study can add to the growing body of knowledge and can be useful as groundwork to further support researches in defining the perception of waiting time of

public transport to increase and improve the pleasure of users of public transport. Passengers place a high value on waiting time, which is determined by environmental elements in terms of safety, security, comfort, and information about when the next car is scheduled to arrive (Taylor, 2009) showed that, depending on the situation, waiting can be a good or bad experience. In a similar way, Taylor (1994) found that waiting is seen as more satisfying when it is spent well than when there is nothing to do while waiting.

Besides, this study contributes to an understanding on how waiting perception is predicted and is explained by several factors such as Socio-demographic characteristics factors (gender, age, and occupation) and trip characteristics factors (trip purpose and trip frequency). These main factors as the main factors predict the level of satisfaction of public transport users.

Waiting time is recognized as one of the most essential component of employees' satisfaction, particularly for public transport industry. The integration of Socio-demographic characteristics, trip characteristics, and waiting time will be tested empirically, and the results could extend the existing body of knowledge.

Found that minimal studies have been conducted on Perception of public transport waiting time. The findings could strengthen the empirical evidence of the impact of passengers' Socio-demographic characteristics and trip characteristics on public transport waiting time of the Malaysian public transport industry.

The outcomes of this study will contribute and help the public transport users to face the outcomes of waiting time perception in Malaysia. Usually, the users of public transport face some challenges and problems when they are waiting public transport services. Based

on this research, the factors which influence waiting time perception to commit to user's satisfaction can be recognized. It would deliver valuable information to public transport users in Malaysia.

Other than that, this research will support the public transport users to be well arranged because this research gives an understanding of the cooperative level in addition to individual level to have adjustment in the host station of the public transport which influence user satisfaction. Besides, this research can help other researchers find information and serve as a guide or point of reference for how they should do their own research in the future.

Finally, the results of this paper could provide foundation to the users of public transport, operators and the government notably when addressing multimodal mode selection scenarios in the Malaysian public transportation system.

1.6 DEFINITIONS OF KEY TERMS

Public transportation: is an important and integral part of city life. It shows how people move around in different cities. Public transport is a way for people to get around by group travel systems that anyone can use. Unlike private transport, public transport is usually based on a schedule, follows set routes, and charges a set fee for each trip (Shtayat et al., 2020).

Perceived waiting time: is how long the passenger thought he or she spent between leaving and arriving. (Allen et al., 2018).

Socio-demographic characteristics: is a person's or group's place on the Socio-demographic scale, which is made up of both social and economic factors like age, gender, and job (Meng et al., 2018).

Trip characteristic: every kind of travel is defined by the way it is done, how long it takes, and where it stops. These travel traits are called travel characteristics, and they are the focus of descriptive and extrapolative models that affect how people act when they travel. (Buliung, 2005; McNally and Rindt, 2007).

Trip purpose: Purpose of a trip is the main activity at the destination of a trip such as work (Susilawati & Lim, 2021).

Trip frequency: how many times over a day, a week, a month, or a year does a user performs a specific trip (Meng et al., 2018).

1.7 ORGANIZATION OF THE RESEARCH

This study comprises of five chapters. The first chapter introduces the background of research. Following that is the second chapter that reviews the relevant literature on perception of waiting time, Socio-demographic characteristics, and trip characteristics. The third chapter describes the methodology. Chapter four discusses the results obtained and finally the conclusion of the study outlines in the chapter five.

CHAPTER TWO:

LITERATURE REVIEW

2.0. INTRODUCTION

With passenger satisfaction becoming more and more important, waiting time perception has become a trending topic in the field of public transportation. The difference in time between when you leave and when you arrive is the real travel time. Perceived travel time is how long a passenger thought he or she was on the trip between the departure and arrival. In general, the time people think it takes to travel could be longer or shorter than the actual time it takes.

This is the second chapter of the study of waiting time Perception of public transport: effects of Socio-demographic characteristics and trip characteristics in Malaysia. It talks about the literature review. It is the review of the literature that looks at how different authors have analyzed past research. This study focuses on variables related the perception of public transport waiting time. The dependent variable is perception of public transport waiting time while independent variables are Socio-economic characteristics and trip characteristics.

2.1. WAITING TIME PERCEPTION EFFECTS ON SOCIO-DEMOGRAPHIC CHARACTERISTICS

One of the most important things that affects how people feel about the quality of public transportation is waiting time. Public transportation is an important and integral part of city life. It shows how people move around in different cities. The point of public transportation

is to make it easy for people to get from one place to another (Al-Masaeid et al., 2016). It helps describe a city's social traits and economic growth (Zuidgeest, 2005).

Allen et al., (2018) found that waiting time perception is more important than travel time perception. In fact, the effect of perceived waiting time is the biggest of all, and it affects every single latent construct. Also, the authors noticed that the effect on perceived waiting time is not linear. When the perceived waiting time is between 10 to 20 minutes, the effect is strong. This result shows that waiting time is very important and is a key policy variable for the government. Perceived travel time is also a strategic policy variable. It acts like perceived waiting time, but the effect is not as strong. People waiting for public transportation are more likely to think they have to wait longer than they actually do, especially when they don't have access to real-time traffic information (Cheng & Tsai, 2014).

Service providers for public transportation use different control and priority measures to improve the reliability of their services. Real-time information (RTI) about when vehicles were expected to arrive was also originated to reduce both the waiting time perception and the actual waiting time (Brakewood et al., 2014; Dziekan & Kottenhoff, 2007; Mishalani et al., 2006).

For customer satisfaction in the service industry, perceptions of waiting times are vital, in addition to the objective magnitude (Maister, 1985). Any difference among subjective and objective waiting time expectations may lead to suboptimal decisions. The analysis of travelers' attitudes and perceptions concerning waiting time uncertainty is therefore crucial. It has consistently been shown that occupied time reduces waiting time perception (Jones, 1996; Molin et al., 2020), thereby affecting beliefs about expected waiting times.

It has been shown that waiting times, especially when it is under uncertainty, are seen as much more difficult than other parts of a public transportation trip (Wardman et al., 2016). But pre-trip or end-route information can reduce both the user's waiting time perception and the actual waiting time (Brakewood and Watkins, 2018).

Even though waiting times in public transportation networks are always hard to predict, (Shokoohyar et al., 2020) found that in Philadelphia, the estimated waiting time was associated to extreme weather on weekdays but not on weekends, and that Lyft's estimated waiting time was much under Uber's. Most importantly, (Nair et al., 2020) revealed that waiting time was linked not only to supply but also to demand in a complex way. So, when modelling waiting time, the spatiotemporal patterns of demand need to be taken into account. Previous studies haven't looked at one important factor, traffic conditions, which could be a factor in how long people have to wait.

Shtayat et al., (2020) did a study on waiting time for public transportation in Jordan. They found that most people who use public transportation are students, who make up about 31percent of all users, followed by people who work in the public and private sectors, who make up 25% and 14%, respectively. About 19% of the people in the country use public transportation in some other way. For the goal of the trip. About 35% of all trips were for educational purposes, 30% were for work-related purposes, and about 35% of all trips were for other reasons. They also established that the wait time was longer during busy times than during less busy times. It means that during rush hour, employees and regular users would have to wait for a long time. When difficulties such as traffic jams cause delays in public transportation, this is called "rush hour." This means that it will be hard to get to the

station on time. During rush hours, a lot of people want to use public transportation, and they don't have any other options.

The factors that affect perceived waiting time differ from city to city, but age and busy times are the most common ones. Several studies also found that the time people thought they spent walking was often longer than the time they actually spent walking. Some of the things that may have led to this overestimation are the physical facets of transfer facilities, like signs, lighting, circulation lines, and the environment around them (Hall, 2001).

Yang et al., (2021) came to the conclusion that there is a link between waiting time and trip-level factors like traffic, the surge multiplier, and bad weather. Waiting time is linked to the distance to the central business district in terms of the built environment. It is linked to the opposite of road density, transit station density, and land-use entropy. Waiting time is also higher in places with a lot of Black and Hispanic people, but it is lower in places where people have less money. However, Fan et al. (2016) found that waiting is often seen as a bad thing and is a big reason why people don't switch to transit. When people have to wait longer, it will be more crowded.

Crowding in the train and at the station, passenger behavior, travel information, and waiting time are unsatisfactory characteristics of the transit areas that negatively impact riders' perception of the service as a whole (Obsie et al., 2020). Moreover, long wait times on the Addis Ababa Light Rail Transit AALRT and heavy demand during peak hours contribute to increased congestion. Crowding and inappropriate passenger conduct increased safety and security issues, resulting in apprehension about utilizing the light rail system.

Kumar & Sinha, (2021) argued that the effect of waiting time is more than that of travel time and cost, which shows that people don't like to wait. If a transit mode doesn't run very often and makes people wait longer, this could make public transportation less appealing. On the other hand, Allen et al., (2018) looked into how perceived waiting time affects both overall satisfaction with the system and satisfaction with a particular bus line.

It is important to learn more about the traveler's traits and service qualities that contributed to the adoption of shared autonomous vehicles (SAVs) in Kuala Lumpur, Malaysia, and to do so revealed preference and stated preference surveys were assumed. According to the revealed preference survey data, respondents who are younger (20 to 29 years old) are more likely to embrace SAVs. In addition, people with middle-class incomes are more likely to use SAVs. In addition, the stated preference displayed that walking time, waiting time, and travel time was stated to be the most important indicator in the traveler's journey decision (Susilawati & Lim, 2021).

Majid et al., (2020) identified Time callouts, extra reading time, extra break time, transfer schedule, transfer number, transfer time, train speed and train waiting time really contribute to time savings for MRT users.

As a factor affecting the service public transport attractiveness, waiting time at transit stops has been identified as a major contributing component (Caulfield and O'Mahony, 2009; Chalumuri et al., 2017; Larsen and Sunde, 2008; Li and Preston, 2014). It has been revealed that passengers respond more strongly to wait time than to time spent in the vehicle (Eberlein et al., 1998; Larsen and Sunde, 2008).

Urban trip makers' arrival at transit stops, and their waiting time, are usually coordinated with the schedule and timetable of public transport services (Gong et al., 2016; Sun et al., 2015). As a result, several transit agencies have been identifying appropriate policy requirements for mitigating perceived burdens associated with transit stops waiting (Fan et al., 2016).

The time it takes to wait for a bus and get on it is a measure of how well the service works. Norhisham et al., (2022) revealed that a bus with a shorter time between departures is considered to be the most efficient for that route because passengers have to wait the least amount of time to get on. (Young et al., 2020) thought that differences in travel times were often caused by transfers and long walk- and wait-times for public transportation.

As stated by Witchayaphong et al., (2020), gender, age, average income, auto ownership, total travel costs for private transportation, total travel times for public transportation, and distances from home to mass transit stations have an impact on travelers' mode selection behavior on mass transit. According to the study, travelers' likelihood to use mass transit is inversely proportional to age, income, travel time of public transportation, car ownership, and distance range.

The role of Socio-demographic and trip characteristics in mode selection between city buses and informal transit services has been studied by (Gadepalli et al., 2020) in their study. Using household surveys conducted in Visakhapatnam, India, they found that gender has a negative correlation with Socio-demographic variables, i.e. women prefer paratransit, whereas men prefer buses. The low coefficient value of age indicates that its relative impact is lower than that of the other variables, despite its significant positive correlation. Daily wage and unemployed employees are the only occupation categories with significant

positive correlations towards buses, meaning they are more likely to take the bus than formal workers.

In their study, Wong et al., (2018) made a model called "Binary logistic regression models." The model's results showed that public transportation modes, travel fare, walking and waiting times, seat availability, and a number of socio-economic factors are key factors that affect how elderly people decide to travel.

Berggren et al., (2021) showed how important it is to have access to pre-trip information, especially for trips longer than an hour, so that you can plan ahead and minimize waiting times. Also, people of different ages and genders use and get their pre-trip information in different ways. The purpose of the trip and the time of day affect waiting times and the best way to optimize the trip (arrival or departure time).

On the study of the quality of Addis Ababa's light rail transit service: Passengers' Views and Perspectives (Obsie et al., 2020) stated that reducing commute time, travel costs, and traffic problems. These perceived benefits vary depending on the Socio-demographic and Socio-demographic characteristics of the passengers. Improving the whole experience while taking Socio-demographic characteristics into account can help the city create a system that improves the benefits of rail transportation for its citizens and helps it reach its goal of keeping current ridership (Woldeamanuel et al., 2022).

Chepuri et al. (2022) initiated that safety is more important to women than to men. Information that was accurate at bus stops and on the internet wasn't as important as being on time, being reliable, perceived waiting time at bus stops, and other transit metrics. As Márquez et al., (2019) found, the way people feel uncomfortable is affected by things like

their level of education and gender. In particular, they found that people with more education feel more uncomfortable than people with less education.

Allen et al. (2019) revealed in their study that most transfers between buses and other means of transportation don't have an impact on how satisfied bus passengers are. They suggest that from the standpoint of users, efficiently constructed transfer-based networks might be an appropriate solution, and it will reduce the waiting time.

2.2. WAITING TIME PERCEPTION EFFECTS ON TRIP CHARACTERISTICS

Young et al., (2020) found that trip characteristics affect travel time differences much more than person-level characteristics. Once a person has decided to use Ride Hailing, it doesn't look like their personal traits will affect the type of trip they go on. Instead, the amount of time they save by taking RH instead of transit depends on where they are going, when they are going, why they are going, and what the fastest transit option is.

From the point of view of impact factors, (Meng et al., 2018) found that Socio-demographic factors, trip characteristics, and how often facilities are used seem to have an effect on passengers' perceptions of travel time, while the time spent to travel on the previous stage doesn't have much of an effect.

According to de Oña (2022) in his study of how private car users feel about service quality, satisfaction, and their plans to use public transportation revealed that the best things about Madrid were safety, ease of access, and proximity. The worst things were individual space, cost, and temperature. In Lisbon, punctuality, personal space, and safety were rated the worst, while safety, accessibility, and ease of use were rated the best.

All types of passengers care a lot about security, both at the station and on the train. To advance security, ideas like installing Closed-Circuit Television could be helpful. Most of the features are important to women, so improving these features in cars for women can keep customers and bring in new ones. Users in the 30–39 age range look at things like access time, travel time, waiting time, and exit time when putting things into categories (Mesbah et al., 2022).

Functional service quality is the most important to passengers because it has the most effect on their overall satisfaction. It showed that how the Grab ride-hailing service is delivered to a passenger will affect how happy they are with the service. When the service process (functional quality dimension) is enjoyable, ride-hailing service users are happier (Service et al., 2022).

Yuan et al. (2019) introduced that some service attributes, like being on time and being reliable, are less important to older people. However, other aspects, like service and security, convenience, and driver service, need to be improved because they are crucial to the elderly but have low ratings for their perceived performance from their point of view.

According to Majid et al. (2020), eight components of the MRT transportation system greatly contribute to the user's ability to travel through time up to three times. But the public's low level of satisfaction with time-saving features and factors has made it hard for the MRT operation system to help users save the most time. As a result, the public user does not significantly save time, which could have a negative impact on how MRT transportation is used in Malaysia in the future.

Since people are unable to account for time in the same way they do for money, the sunk-cost effect doesn't exist for time (rather than money, as most authors do). Nonetheless, he does not deliberate travel time in choices of transportation where, often, one component is traded-off for another within the similar trip, which could make it simpler for individuals to keep track of their time (Soman, 2001).

Nevertheless, there are an amount of concerns involving with public transportation services, such as a lack of amenities, low-quality public transportation services and interchanges, a hard-to-use fleet, few people using the service, and long wait times (Kenworthy, 2006; Christy and Adjo, 2005; Zegras, 2005; Rahim and Ghani, 2004; Litman, 2007; Banister, 2000; Nur Shazwani et. al, 2012; Whitmarsh et. al, 2007; Hull, 2005).

Customers frequently suffer the inevitable need to wait for service, and experts indicate that this situation may negatively impact a client's perception of the business (Butcher & Kayani, 2008; Pruyn & Smidts, 1998; Taylor, 1994). The perceived waiting time and the customer's emotional reaction to the wait make up the customer's waiting experience.

Zhou et al. (2020) did a thorough review of the factors that exaggerated the adoption of shared autonomous vehicles (SAVs) in different places. It was stated that the main things that affect SAV adoption are time spent waiting, travelling, paying for parking, looking for parking, and willingness to share transportation (Cools et al., 2017).

2.3 CONCLUSION

This is the second chapter of the study on how Socio-demographic factors and trip features affect people's perceptions of public transportation waiting times in Malaysia. To match the study's variables, I have compiled several scholars' studies in this part. According to

the literature review, some Socio-demographic factors, including age, gender, and occupation, along with trip characteristics, including the trip frequency, and trip purpose, can directly affect how people perceive the length of a public transportation wait time.



CHAPTER THREE:

METHODOLOGY

3.1 INTRODUCTION

This chapter talks about the ways that information will be gathered out in the field. This chapter is mostly about how this study will be done, including the methods and techniques that will be used to collect data. Moreover, in this chapter, several items will be covered and includes; research design, next section demonstrates the population, sample and sampling technique & unit of analysis, after that questionnaire design explained and also research measure/Instruments next section elaborates data collection strategy, following that, this chapter illustrates data analysis techniques and finally followed by summary of the chapter.

3.2 RESEARCH FRAMEWORK

This study indicates the waiting time perception of public transport users in Northern States of Malaysia through the effect of Socio-demographic characteristics and trip characteristics. Based on the extensive literature review, this section illustrates the research framework as shown in figure 2.1. The research framework has five variables: Socio-demographic characteristics (age, gender, and occupation) and trip characteristics (trip frequency, and trip purpose) are independent variables while perceived waiting time serves as the dependent variable of this study.

Independent Variables

Dependent Variable

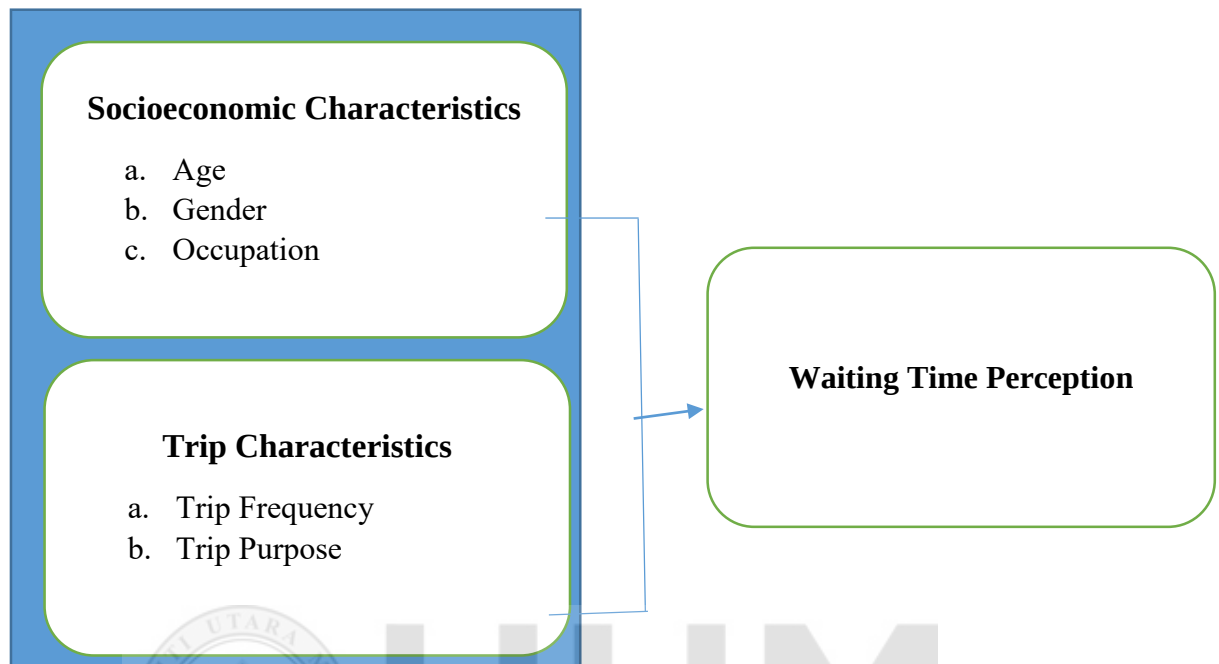


Figure 3.1: Research Framework

3.3 HYPOTHESIS DEVELOPMENT

Researcher formulated some testable hypotheses after the research objectives, research questions and literature review. The known facts, possible solutions, and expected results from the variables being studied all affect how important the research hypothesis is. The researcher's answers to the questions and hypotheses make the study's goals clearer and more focused. Hypotheses are formal explanations written down in a way that can be tested. The hypothesis implies a relationship between two variables and it states that one concept is related to another (William G Zikmund, 2013).

3.3.1 Relationship between Socio-demographic characteristics and waiting time perception

Socio-demographic status is a person's or group's place on the Socio-demographic scale, which is made up of both social and economic factors like age, gender, and job. Meng et al. (2018) stated that age and occupation have an influence to the waiting time perception. Similarly, Susilawati & Lim (2021) determined that regardless mode of transport, gender, age, and occupancy are susceptible to waiting time. Yang et al. (2021) Waiting time is also greatly influenced by Socio-demographic factors. Researchers looked at the effect of waiting time and expected delays on the value of certainty. They found that younger travelers tend to want more certainty (Shelat et al., 2021).

As people get older, they care more about things like how far they have to walk, how easy it is to change trains, and waiting time (Alsnih and Hensher, 2003). Woldeamanuel et al. (2022) looked at how people in Addis Ababa thought about the social and economic benefits of the light rail. The researchers established that the city transport bureau should focus on ways to improve the quality of LRT service that take into account young, middle-aged, and older age groups, as well as passengers' genders and whether or not they are married. For example, the waiting time for LRT should be shortened.

H1 (a): there is a positive relationship between user's age and waiting time perception.

H1 (b): there is a positive relationship between user's gender and waiting time perception.

H1 (c): there is a positive relationship between user's occupation and waiting time perception.

3.3.2 Relationship between trip characteristics and waiting time perception

According to Meng et al. (2018) trip purpose affect the waiting time perception. In order to figure out the trip frequency distribution for observed waiting time, (Roy & Basu, 2021) found that the distribution of waiting time is positively skewed, and the number of times it happens goes down as the value of waiting time goes up. When you add in the fact that bus riders also spend more time in the car, you can figure out that bus riders are willing to wait longer for better service. on longer trips. Users prefer to spend less time waiting for trips that are shorter in length, so they prefer low capacity paratransit services that run more often (Gadepalli et al., 2020).

Allen et al. (2018) recently used the SEM-MIMIC framework to model service-specific and global transit satisfaction in a case study of Santiago, Chile, focusing on the bus part of an integrated PT system. They found that the use frequency and trip purpose to be significant for the waiting time perception. Berggren et al., 2021, pointed out how important it is to have information before a trip, especially for trips longer than an hour, so that you can plan ahead and make the most of your waiting time. Also, the utilization and origin of pre-trip information change depending on the purpose of the trip and the time of day. This can affect waiting times and the trip optimization strategy chosen (arrival or departure time).

H2 (a): there is a positive relationship between trip frequency and waiting time perception.

H2 (b): there is a positive relationship between trip purpose and waiting time perception.

3.4 RESEARCH DESIGN

A research design is a plan that spells out how and where information will be gathered and analysed. The plan is to make sure that all the information collected can be used to solve problems (Zikmund, 2003). It is also research that tests a theory. To test the hypothesis, it will depend on the variables and how the scale is used. Hypothesis is a guess about the relationship between two or more variables, written as a statement that can be tested (Sekaran, 2003).

In order to explore the effects of Socio-demographic characteristics and trip characteristics to the perception of public transport waiting time, this research decided to adopt a quantitative approach. A quantitative method looks at how theories relate to each other and collects data in the system of numbers (Bryman and Bell, 2011). The quantitative approach was selected because it can reach more people than a qualitative approach (Bryman and Bell, 2011) and because it has been used in numerous studies in the same field that were mentioned in the literature review. The measurements of Socio-demographic characteristics on the perception of public transport waiting time are made in three gender, age, and occupation. Trip characteristics has been supported by two measurements namely, trip purpose and trip frequency.

This study will employ Pearson Correlation and regression Analysis with both of independent variables and dependent variable. This research uses hypothesis testing in order to explain the effect of Socio-demographic characteristics and trip characteristics on perception of public transport waiting time in northern Malaysia.

3.5 POPULATION, SAMPLE AND SAMPLING TECHNIQUE AND UNIT OF ANALYSIS

Since the study data comes from people who use public transportation, the population of this study is all people who use public transportation at a selected bus stations in northern states of Malaysia. The researcher will contact to the administrative staff at the Changlun bus station to find out more about the characteristics of the target population and the right sample size for the target population.

Denscombe (2009) revealed that getting access to all information can be hard and take a long time. The researcher will find this to be true. As an alternative of a probability sampling method, a non-probability sampling method called "convenience sampling" will be used. The nonprobability sampling method will be chosen because it is hard to reach the whole population and there isn't enough information about the population. (Denscombe, 2009) indicated that these are all good reasons to choose a non-probability sampling technique. Bryman and Bell (2011) also discovered that convenience sampling is a good method because it is available to the researcher by virtue of its accessibility. Also, several of the previous studies about public transportation waiting times that were mentioned in the literature review, such as (Allen et al., 2018; Márquez et al., 2019), also used convenience sampling, which convinced the researcher that this sampling technique was valid and could produce reliable results.

3.6 QUESTIONNAIRE DESIGN

The online survey's questionnaire will try to answer the goals and hypotheses of the current study. This research study uses well-tested questionnaires to find out waiting time

perception among users of public transport in Northern States of Malaysia. The questionnaires for this study were taken from research that had already been done.

The questionnaire will have a repeated measures design, with more than one question about the same idea. The questions will be put in a way that starts with more general questions about the participant's experience with service innovation. This is to get the participant interested in the topic and set the stage (Brace, 2004). The questionnaire has six parts, one of which is about Socio-demographic factors. Section A of the questionnaire pertains to the Socio-demographic factors of the respondents, which mainly refer to their personal background information. All the questions in this section are designed as closed-ended questions. Then, Section B is about age, Section C is about gender, Section D is about occupation, Section E is about the reason for the trip, Section F is about trip frequency, and Section G is considered waiting time perception.

While making the survey, particularly when creating Likert-type scale questions, order bias will be taken into account. Researcher have found that people tend to put more weight on the left side of a self-administered scale (Friedman, Herskovitz, & Pollack, 1993). Acquiescence bias is another aspect to think about. It happens when people tend to agree with statements rather than disagree with them (Kalton & Schuman, 1982). The structure of the survey will be changed in two ways to reduce these biases. The negative response is on the left side of the scale because that is the way it was put together. It gives the most unfavorable response pattern and stops people from saying too much. Also, some of the questions will be asked in a negative way. This means that the same question won't be asked over and over again without being changed. It also gives a measure of internal consistency and reduces Order bias resulting from averaging.

Researcher can set answer requirements for online surveys to reduce the number of unanswered questions. However, the survey's setup left a number of questions open-ended and only asked the participant to answer them. This will be done to stop the participants from making guesses about data if they don't know something.

Table 3.1: Constructs and Sources

Variables	Number of Items	Scales	Sources
Socio-demographic characteristics	4	Close ended	Allen et al., 2018
Trip characteristics	5	Likert Scale	Allen et al., 2022
Perceived Waiting Time	7	Likert Scale	Hall, 2001
Total	16		

3.7 RESEARCH MEASUREMENT

Likert Scale will be made as a common way to measure things in questionnaires. The people taking part in the research will be asked to answer the questions using one of five ordinal scales. Each scale has a specific value that ranges from 1 to 5, where 1 means the person strongly disagrees and 5 means they strongly agree. Before you can choose the right method of analysis, you need to know the level of measurement. For every kind of measuring, there is a right way to do it and other ways that can't be used. Ordinal scale is a way to rank or rate data by using integers in either ascending or descending order. The numbers that are given to the important things (1, 2, 3, 4, 5) do not show that the distance

between scales is the same, nor do they illustrate exact amounts. They are just labels with numbers. Using the Likert Scale, the researcher has the following:

Table 3.2: Questionnaire Likert Scale

Item	Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree
Scale	1	2	3	4	5

3.8 DATA COLLECTION STRATEGY

In order to gather empirical data from public transport users, the researcher decided to distribute questionnaires. The benefits of using this data-gathering tool mean that the researcher can get a lot of information from a lot of individuals in a brief period of time and at a low cost. It is also thought to be the best way to get standardized data (Denscombe, 2009; Bryman and Bell, 2011).

Researcher will use two methods to gather information from the respondents. The first method is through online survey and the second method is by handing over the questionnaire booklet to respondents. Researcher will use the online survey to collect data from Penang, Perlis, and Perak to test the proposed framework. Researcher will use Google Form to create the online survey. The online survey provides an URL address after creating the questionnaire. Following that, an introduction message and Call for participation in the survey with the URL link will send through social media (e-mail and WhatsApp) to the users of public transport from Penang, Perlis, and Perak. This online survey is flexible as, to answer the questionnaire, respondents just need to connect on the “URL link” and it will

direct them to the online questionnaire. Finally, after completing the survey, participants clicked on the “submit” button and researcher will receive in the survey database.

Following that, to get more responses, researcher will use a second method which is handing over the questionnaire booklet to users of public transport from Kedah. The survey will design in a certain procedure whereby an introduction letter, permission letter, consent letter from UUM and survey questionnaires will send to the users of public transport from Kedah. The permission letter will send to the users of public transport in Kedah before conducting the survey. The introduction letter explains participants about the objective of the study and also mentioned that their responses would be kept anonymous and will be strictly confidential. The survey questionnaires and the introduction letter will develop together into a booklet form.

The researcher will follow up on the invitation to take the survey or send a reminder. While this has been shown to increase response rates by a large amount (Bryman & Bell, 2011; Millar & Dillman, 2011). Some researchers (Fey and Denison, 2003) send up to four reminders, which can include phone calls. This can help get more feedback.

3.9 DATA ANALYSIS TECHNIQUE

Researcher have put all of the data from every survey questionnaire that they have collected into an Excel sheet. The next step will be to pick and use the right statistical tools to look at the data that has been gathered. Statistical Package for Social Science (SPSS) version 28.0 will be used to analyze the results of the questionnaire. This is a good way to analyze statistical data, and it includes all of the traditional methods of modern statistics (Eckstein, 2012; Lehnert, 2000). The collected data will be put into SPSS 28.0, summarized, analyzed,

and interpreted so that the three research goals and questions can be met and answered. After getting the data through questionnaires, there are only a few steps to data analysis. Every survey form that comes back from respondents will be checked to see if all the questions were answered or if some were left blank.

Cronbach's will be used to figure out how reliable the questionnaire is. Field (2013) revealed that Cronbach Alpha should be used on each part of the questionnaire separately. Cronbach's Alpha is a measure of how well the items in a set are related to each other in a positive way (Sekaran, 2003). After that, descriptive analysis will be used to look at the data. The goal of descriptive analysis is to figure out how to count and make sense of the data based on how they are described. The point of descriptive analysis is to look at the Socio-demographic variables, independent variables, and dependent variables. Frequencies and percentages will be used to look at the categorical variables, while mean and standard deviation will be used to look at the continuous variables.

In addition to the descriptive analysis, a correlation analysis and a regression analysis will be done. These will be chosen because they are the best fit for the goals of this study. With the help of the analyses, a link could be found between the explanatory variables and the explained variables. In addition, regression analysis allows exploring the relationship between several factors that can be used to predict an outcome and the outcome itself (Field, 2013). During the present study the researcher collected a total of 196 respondents who uses public transport in Malaysia.

3.10 CHAPTER SUMMARY

As well as explaining the characteristics of the research population and sample, this chapter also discussed its methods and design to adapt to the research population. Additionally, the chapter discussed the statistical analysis tools to be used for analyzing the collected data, along with tools to be used for testing the validity and reliability of the research data collection method. It also describes the research measurement/instrument and the questionnaire design of the study. Data analysis and the finding will be discussed in the next chapter.



CHAPTER FOUR:

DATA ANALYSIS AND FINDINGS

4.0 INTRODUCTION

This chapter discusses the results of this study. This chapter consists of five sections. The first section describes about the profile of the respondents of this study using frequency. Next section describes about descriptive statistics of the variables of this study. Reliability analysis using Cronbach Alpha is also outlined in this chapter. Following that, this chapter presents the inferential analysis consisting of Pearson correlation and multiple regression to test the main hypothesis of the study. Conclusion of the chapter is discussed in the final section.

4.1 PROFILE OF THE RESPONDENTS

This following section describes the background of the respondents of this study. The background of the respondents consists age, gender, occupation, and experience of riding bus of the respondents.

As shown in Table 4.1 and from the analysis using SPSS, the frequency result shows about the gender. Results reveal that 113 of the respondents were females (57.7%) and 83 (42.3%) were males. The statistics shows that the majority of the respondents were female. Moreover, the results show that the highest age group was between 31 to 40 years representing 63 respondents which is 32.1 percent. Following that, frequency results shows that the age group between 20 to 30 years has 57 respondents which reports 29.1 percent. Next, 51-50 years' age group of respondents consists of 42 respondents and 21.4% from sample of respondents. 26 (13.3%) respondents of the study were under 20 age of group.

The smallest age group was 51 and above age group which is consisting of 8 respondents or 4.1% from the sample.

The occupation of respondents shows that the majority of the respondents are employed who accounted for 104 or 53.1% respondents, and the remaining 46.9 percent are others such as students and unemployed which reports 92 of the respondents. As depicted in Table 4.1, the majority of the respondents had more than 10 times experience of riding bus which consists 103 or 52.1 percent of the respondents. 60 or 30.6% of the respondents had 2-10 times experience of riding bus. Moreover, 16.8 percent of the respondents which reports 33 had 1st time ever experience of riding bus.

Table 4.1 profile of the respondents

Socio-demographic	Category	Frequency	Percent
Gender	Male	83	42.3
	Female	113	57.7
Age	Under 20	26	13.3
	20-30	57	29.1
	31-40	63	32.1
	41-50	42	21.4
	51 and above	8	4.1
Occupation	Employed	104	53.1
	Others	92	46.9
Experience of riding bus	1st time ever	33	16.8
	2-10 times	60	30.6

4.2 DESCRIPTIVE STATISTICS OF VARIABLES OF STUDY

In this section, mean scores and standard deviations are shown along with other descriptive statistics about the data. The theory states that the mean of the data and the standard deviation, or the average amount of difference from the mean (Bryman & Bell, p. 360), show how the people answered the questions.

In the tables below they are presented the mean, and Standard Deviation of the following variables: Socio-demographic characteristics, trip characteristics, and waiting time perception. Over the 16 items of the 3 components, the means ranged from 1.24 to 3.49. In addition, the standard deviation rates are between 0.462 and 1.242.

4.2.1 Socio-demographic characteristics

To begin with, the Socio-demographic characteristics mean ranged from 1.47 to 2.74. On one hand, the highest mean rate belongs to the age of the respondents. On the other hand, the lowest rate item is the occupation of the respondents. Moreover, the highest standard deviation goes to the age of respondents which is 1.066.

Table 4.2 Descriptive statistics of Socio-demographic characteristics

Items	N	Minimum	Maximum	Mean	Std. Deviation
Age	196	1	5	2.74	1.066
Gender	196	1	2	1.58	.495
Occupation	196	1	2	1.47	.500

Experience	196	1	3	2.36	.754
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4.2.2 Trip characteristics

Additionally, the trip characteristics items ranged in mean from 1.24 to 2.30. The item describing the time of the day that respondents travelled most, had the lowest rate, while what they used to reach or access to the bus stop, had the highest rate.

Table 4.3 Descriptive statistics of Trip characteristics

Items	N	Minimum	Maximum	Mean	Std. Deviation
T1	196	1	2	1.31	0.462
T2	196	1	4	2.30	1.175
T3	196	1	2	1.24	.428
T4	196	1	3	2.02	.781
T5	196	1	3	1.84	.719

4.2.3 Waiting time perception

The mean of the perceived waiting time items ranged from 1.28 to 3.49. The item with the lowest mean rate is the information about the bus. The item with the highest mean rate is the actual waiting time at bus stop.

Table 4.4 descriptive statistics of waiting time perception

Items	N	Minimum	Maximum	Mean	Std. Deviation
W1	196	1	6	2.95	1.208
W2	196	1	6	3.49	1.242
W3	196	1	4	1.28	.629
W4	196	1	3	1.53	.800
W5	195	1	3	1.37	.625
W6	196	1	3	1.32	0.576
W7	196	1	3	1.34	.615

4.3 RELIABILITY ANALYSIS

Reliability analysis has been conducted for this study. The reliability analysis was done to make sure that the questionnaire used in this study is reliable, consistent, and stable. Cronbach Alpha is used to measure the reliability coefficients for all questions about Socio-demographic characteristics, trip characteristics, and perceived wait time. According to the literature, Cronbach's Alpha is considered to be acceptable when it is 0.7 or higher (Hair et al., 2010).

The value of reliability coefficients for the questionnaires is above 0.6. The Cronbach Alpha of Socio-demographic characteristics showed 0.708, trip characteristics was 0.705, and perceived waiting time initiated 0.706. Table 4.5 shows how the Cronbach Alpha test found the reliability coefficients for each variable.

Table 4.5 Reliability Coefficients (Cronbach Alpha) of the scales

Variables	N0. of Items	Cronbach's Alpha
Socio-demographic Characteristics	3	0.708
Trip Characteristics	5	0.705
Waiting Time Perception	7	0.706

4.4 INFERENCE STATISTICS

In this section, the researcher talks about the study's inferential statistics and what they showed. Inferential statistics shows how to draw conclusions about the relationship between two variables, the differences between subgroups of a variable, and how a few explanatory variables might explain the variation in a explained variable (Sekaran, 2003). This section has two subsections. The first one (4.4.1) shows the results of the Pearson correlation between the main variables of this study. The study's hypothesis is tested in the second part (4.4.2), which talks about the results of the multiple regressions.

4.4.1 Pearson Correlation

Correlation is a way to measure how strongly two variables are linked in a straight line. There are three possible ways for the two variables to relate to each other: a positive linear correlation, a negative linear correlation, or no correlation at all (Fah & Hoon 2009). The Pearson correlation coefficient is used to look at the relationship between the study's variables (those that are independent and those that are dependent).

The Pearson correlation coefficient is used to find out how the study's variables are linked (independent, and dependent variables). As illustrated in Table 4.6 below, perceived

waiting time has a no significant but negative relationship on the Socio-demographic characteristics ($r = -.468$, $p < 0.01$).

Table 4.6 correlation among perceived waiting time and Socio-demographic characteristics

Variables	waiting time perception	Socio-demographic characteristics
Perceived waiting time	1	
Socio-demographic characteristics	-.468**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Next, the results reveal that Perceived waiting time has a positive relationship on the trip characteristics ($r = .070$, $p < 0.01$). this shows that an increase in perceived waiting time would lead to higher trip characteristics.

Table 4.7 correlation among perceived waiting time and trip characteristics

Variables	waiting time perception	trip characteristics
Perceived waiting time	1	
trip characteristics	.070	1

** . Correlation is significant at the 0.01 level (2-tailed).

4.4.2 Multiple Regressions

This part presents the findings of the hypotheses tests of the study. There were five hypotheses tested using multiple regressions analysis. This section tests the relationship between explanatory variables and explained variable.

4.4.2.1 Relationship between Explanatory Variables and Explained Variables

There were five hypotheses proposed to test the relationship between IVs (Socio-demographic characteristics and trip characteristics) and DV (waiting time perception). The following part is to test the relationship between IVs (Socio-demographic characteristics and trip characteristics) and DV (waiting time perception).

H1 (a): there is a positive relationship between user's age and waiting time perception.

H1 (b): there is a positive relationship between user's gender and waiting time perception.

H1 (c): there is a positive relationship between user's occupation and waiting time perception.

H2 (a): there is a positive relationship between trip frequency and waiting time perception.

H2 (b): there is a positive relationship between trip purpose and waiting time perception.

Table 4.5 shows the results of the regression analysis for these hypotheses.

Using multiple regressions, the impacts of independent factors were evaluated (Socio-demographic characteristics and trip characteristics) on dependent variable (perceived waiting time). As illustrated in Table 4.8, the regression results demonstrated that the R-square value was .140. This indicates that 48% of variance that explained the DV (waiting time perception) was accounted for by the IVs (Socio-demographic characteristics and trip characteristics) where the F value = 15.726 at $p < 0.05$. Further, of the one IV, trip characteristics ($\beta = .104$, $p < 0.05$) were significant predictors of waiting time perception, meanwhile Socio-demographic characteristics ($\beta = -.378$, $p > 0.05$) was not significant to waiting time perception. Thus, the above findings support the hypothesis H2(a), H2(b) and

did not support for hypothesis H1(a), H1(b), and H1(c). The reason why Socio-demographic characteristics not significant is about the small number of respondents that the researcher received.

Table 4.8 regression analysis of independent variables and dependent variable

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.652	.191		13.895	.000
Socio-demographic	-.459	.082	-.378	-5.576	.000
Trip characteristics	.103	.068	.104	1.531	.128

a. Dependent Variable: waiting time perception

$R^2 = .140$, Adjusted $R^2 = .131$, $F = 15.726$, $p < 0.05$

4.6 Overall Hypotheses Results

The results of the hypothesis testing are summarized in Table 4.9 below as follows:

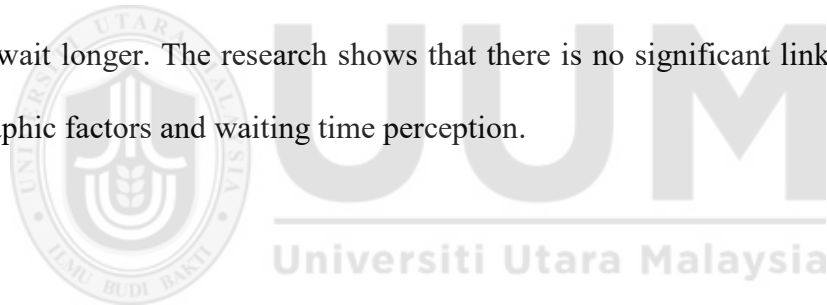
Table 4.9: Overall Hypotheses Results Table

Hypothesis	Regression Results	Decision
H1 (a): there is a positive relationship between user's age and waiting time perception	$\beta = -.378$, $p < 0.05$	Not supported
H1 (b): there is a positive relationship between user's gender and waiting time perception		Not supported

H1 (c): there is a positive relationship between user's occupation and waiting time perception		Not supported
H2 (a): there is a positive relationship between trip frequency and waiting time perception	$\beta = -.104, p < 0.05$	supported
H2 (b): there is a positive relationship between trip purpose and waiting time perception		supported

4.7 CONCLUSION

The study's results show that trip characteristics are strongly linked to waiting time perception. It shows that a higher level of trip characteristics makes people feel like they have to wait longer. The research shows that there is no significant link between Socio-demographic factors and waiting time perception.



CHAPTER FIVE:

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 INTRODUCTION

This last chapter summarizes the results and brings the study to a close. This chapter is divided into four parts. In the first part, we talk about the results and following that summarizes the findings of the study related to the objective of research. Third section discusses about the necessary contributions to the body of knowledge. Next section discussed about the limitations of study and hereafter are suggestions for future research. The conclusion of this chapter is outlined in section 5.6.

5.1 DISCUSSION

The results from the regressions analysis between explanatory variables (Socio-demographic characteristics and trip characteristics) and explained variables (waiting time perception) presents that there is a positive significant relationship between trip characteristics and waiting time perception. Meanwhile, there is no significant relationship between Socio-demographic characteristics and waiting time perception.

Trip characteristics will lead to the high level of perceived waiting time. According to Meng et al. (2018) trip purpose affect the waiting time perception. In order to figure out the trip frequency distribution for experiential waiting time, (Roy & Basu, 2021) found that the distribution of waiting time is positively skewed, and the number of times it happens goes down as the value of waiting time goes up. When you add in the fact that bus riders also spend more time in the car, you can figure out that bus riders are willing to wait longer for a higher level of service on longer trips. Users prefer to spend less time waiting for trips

that are shorter in length, so they prefer low capacity paratransit services that run more often (Gadepalli et al., 2020).

The regression analysis of this study supports this literature and also shows that trip characteristics has positive significant relationship with the waiting time perception at the bus stations. Based on the results of multiple regressions, the researcher found that the proposed trip characteristics was significantly related to the level of waiting time perception.

Next, previous researchers explain that Socio-demographic characteristics has relationship with the waiting time perception. Meng et al. (2018) stated that age and occupation have an influence to the waiting time perception. Similarly, Susilawati & Lim (2021) determined that regardless mode of transport, gender, age, and occupancy are susceptible to waiting time. Yang et al. (2021) Waiting time is also greatly influenced by Socio-demographic factors. The present study found that Socio-demographic characteristics is not significantly related to perceived waiting time and it is not in line with the previous studies because of the small number of respondents that the researcher received. The small feedback from the respondents is lacking to summarize the results of study. Moreover, the period of the data collection is limited.

5.2 SUMMARY OF FINDINGS

This section presents the outline of research results and is discussed based on the research objectives of this study. Researcher has proposed three research objectives in this study and it was discussed separately.

5.2.1 Socio-demographic characteristics and waiting time perception

The second objective of the study is to examine the effect Socio-demographic characteristics and waiting time perception of public transport users specially bus users in Malaysia. The result shows after regressed independent variable (Socio-demographic characteristics) with dependent variables (waiting time perception) and the result reveals that Socio-demographic characteristics was not significantly positively related to perceived waiting time. This result is not in with the previous studies (Meng et al. 2018; Susilawati & Lim 2021; Yang et al. 2021) because of the small number of respondents that the researcher received from the distributed questionnaire.

Following that, previous studies stated that Socio-demographic characteristics have significant effect on the perceived waiting time. Yang et al. (2021) Waiting time is also greatly influenced by Socio-demographic factors. Researchers looked at the effect of waiting time and expected delays on the value of certainty. They found that younger travelers tend to want more certainty (Shelat et al., 2021). Moreover, as people get older, they care more about things like how far they have to walk, how easy it is to change trains, and waiting time (Alsnih and Hensher, 2003).

5.2.2 Trip characteristics and waiting time perception

The third objective of the study is to examine the relationship between trip characteristics and waiting time perception of public transport users specially bus users in Malaysia. The result shows after regressed trip characteristics with waiting time perception and the result reveals that trip characteristics was significantly positively related to waiting time perception of public transport users specially bus users in Malaysia. Similarly, this result

is in line with previous studies as Young et al. (2020) found that trip characteristics affect travel time differences much more than person-level characteristics. Once a person has decided to use Ride Hailing, it doesn't look like their personal traits will affect the type of trip they go on. Instead, the amount of time they save by taking RH instead of transit depends on where they are going, when they are going, why they are going, and what the fastest transit option is.

Following that, Berggren et al., (2021), pointed out how important it is to have access to pre-trip information, especially for trips longer than an hour, so that you can plan ahead and make the most of your waiting time. Also, the utilization and origin of pre-trip information change depending on purpose of the journey and time of day This can have an impact on waiting times and the trip optimization approach selected (arrival or departure time).

5.3 IMPLICATION OF THE STUDY

The findings of the study have contribution towards theoretical and practical. This study has contribution to the body of knowledge. The theoretical contribution of this study is gives an understanding waiting time perception of the users of public transport in Malaysia. This study revealed that trip characteristics significantly predicts the perceived waiting time of the users of public transport. Nevertheless, the study established that the Socio-demographic characteristics not significantly predicted the perceived waiting time of bus users in Malaysia.

Found that minimal studies have been conducted on perception of public transport waiting time. The findings could strengthen the empirical evidence of the impact of passengers'

Socio-demographic characteristics and trip characteristics on public transport waiting time of the Malaysian public transport industry. The results of this study will contribute and help the public transport users to face the outcomes of waiting time perception in Malaysia. Usually, the users of public transport face some challenges and problems when they are waiting public transport services. Based on this research, the factors which influence waiting time perception to commit to user's satisfaction can be recognized. It would deliver valuable information to public transport users in Malaysia.

Aside from that, this research will help people who use public transportation to be better organized because it shows how the host station of public transportation, which affects how people see it, needs to be changed on both an individual and a group level. This research can also help other researchers find information and use it as a guide or reference for their own research in the future.

5.4 LIMITATIONS OF THE STUDY

In conducting the study, there are a few limitations that have to be analyzed. The first limitation of the study is related to the low feedback of respondents. The low feedback from the respondents is lacking to summarize the results of study. Besides that, respondents of this study are focused in Malaysia and the respondents are adjusting to one particular culture although the respondents are from various countries. Therefore, the result of this study should not be generalized and compared to other country as different cultures may influence the result of the study. At the same time, the limitation of this study is the selection of bus stations located in northern region of Malaysia.

The focus of this study was on a selected bus stations in the north of Malaysia. The study's sample was based on a few bus stations in the northern part of Malaysia. So, the study doesn't explain how well public transportation, especially buses, work in other Malaysian bus stations. The data for this study were only collected at one point in time, so it also has a cross-sectional design. Cross-sectional design says that a study can be done in this type of research, data are only collected once over a period of days, weeks, or months. For instance, the level of adjustment of expatriates might change or get better after a certain amount of time.

5.5 RECOMMENDATION FOR FUTURE RESEARCH

Based on the limitation of the study, this study suggests few recommendations for future research. It was suggested that researcher need to ensure the number of responses from their sample of respondents. Researcher should get a large number of respondents to conduct this study. So, researcher must continually follow up regarding the feedback from respondents. More time and actions should be taken in order to reach the respondents by visiting the particular bus stations and handing over the questionnaire to respondents. This will help researcher to get the feedback immediately.

In future, the study should be conducted on a larger population where researcher can collect data from all the bus users all over the bus stations in Malaysia. By doing so, the study will reach more respondents and the results will be more firm to summarize the perception of waiting time in Malaysia. In addition, researcher should expand the study to include bus stations all over the country and should use longitudinal design to collect data of minimum two points because the level of adjustment of waiting time perception will change and it will give great impact on the findings.

5.6 CONCLUSION

Finally, this study has discussed about the effects of Socio-demographic characteristics and trip characteristics on the waiting time perception of public transport in Malaysia. It explains that trip characteristics significantly predicts the waiting time perception of the users of public transport. Nevertheless, the study established that the Socio-demographic characteristics not significantly predicted the waiting time perception of the users of bus in Malaysia. The reason why Socio-demographic characteristics not significant is about the small number of respondents that the researcher received. The goal of reaching bus users' satisfaction is to have enough information about users' perception of waiting time.



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APPENDIX A: QUESTIONNAIRE

Dear Respondents,

I am Ibrahim Hassan Mohamud, a student of Master of Science (Transportation & Logistics Management) from the School of Technology Management & Logistics (STML), Universiti Utara Malaysia. I am conducting a survey on my master dissertation and I humbly seek your kind cooperation to complete the questionnaire of my study. This study is required in completing my master program and it is about the **waiting time perception of public transport user: effects of Socio-demographic and trip characteristics in Malaysia**. Your information will be kept confidential and will be used only for statistical analysis and academic purposes. Your help is very important to this study and I deeply appreciate your kind cooperation. Thanking you in advance.

Yours sincerely,

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Universiti Utara Malaysia.



SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

Instruction: The following items are related to personal information and Socio-demographic characteristics. Please **TICK (/)** your response. Please answer the following items. Your personal information will be kept confidential.

1. Age

- | | | |
|-----------------------------------|---------------------------------------|--------------------------------|
| ☐ Under 20 | ☐ 20-30 | ☐ 31-40 |
| ☐ 41-50 | ☐ 51 and above | |

2. Gender

- | | |
|-------------------------------|---------------------------------|
| ☐ Male | ☐ Female |
|-------------------------------|---------------------------------|

3. Occupation

- | | |
|-----------------------------------|---------------------------------|
| ☐ Employed | ☐ Others |
|-----------------------------------|---------------------------------|

4. Experience of riding the bus

- | | | |
|--|-------------------------------------|---|
| ☐ 1 st time ever | ☐ 2-10 times | ☐ More than 10 times |
|--|-------------------------------------|---|

SECTION B: TRIP CHARACTERISTICS

Instruction: The following items are pertaining to your trip characteristics. Please **TICK (/)** your response. Please select the answer that best suits with your conditions.

1. Purpose

- | | | |
|------------------------------------|--------------------------------------|-------------------------------------|
| ☐ To work | ☐ To home | ☐ To medical |
| ☐ To school | ☐ To shopping | ☐ Others |

2. Reached bus stop by

- | | |
|--------------------------------|--|
| ☐ Walk | ☐ car |
| ☐ cycle | ☐ Others public transport |

3. Time of the day

- | | |
|------------------------------------|--|
| ☐ peak hour | ☐ off peak hour |
|------------------------------------|--|

4. Frequency of use

- | | | |
|--------------------------------|---------------------------------|-------------------------------------|
| ☐ Daily | ☐ Weekly | ☐ Occasional |
|--------------------------------|---------------------------------|-------------------------------------|

5. Ticket Type

- | | | |
|----------------------------------|--|-------------------------------|
| ☐ One way | ☐ book of tickets | ☐ pass |
|----------------------------------|--|-------------------------------|

SECTION C: WAITING TIME PERCEPTION

Instruction: The following items are pertaining to waiting time perception at the bus station. Please **TICK (/)** your response. Please select the answer that best suits with your conditions.

1. Waiting time perception at the bus stop

- | | | |
|----------------------------------|---|---------------------------------------|
| ☐ No wait | ☐ < 5 minutes wait | ☐ 6-10 minutes |
|----------------------------------|---|---------------------------------------|

- ☐ 11-20 minutes wait ☐ 21-30 minutes wait ☐ > 30 minutes wait
2. Actual waiting time at the bus stop
- ☐ Early ☐ < 2 minutes late ☐ 2-5 minutes late
- ☐ 6-10 minutes late ☐ 11-20 minutes late ☐ > 20 minutes late
3. Information about the bus schedule
- ☐ Available ☐ Ask for direction ☐ None
4. Waiting for vehicles makes me feel anxious
- ☐ Yes ☐ No ☐ Don't know
5. I would not like to use bus as the frequency is very high
- ☐ Yes ☐ No ☐ Don't know
6. Waiting for vehicles makes me feel boring
- ☐ Yes ☐ No ☐ Don't know
7. Waiting time has affected my daily activities
- ☐ Yes ☐ No ☐ Don't know



Thank you for your kind participation